Ductile failure prediction of spot welded lap joint

Abstract :

A finite element (FE) model incorporating a progressive material damage with Rice-Tracey damage initiation criterion is developed in this study. The relationship between local ductility reduction and stress triaxiality was established experimentally. The FE model was validated by comparisons of load-displacement response of the spot welded lap joint specimen at displacement rate of 5 mm/min and the observed ductile failure mechanism. Results show that Rice-Tracey damage initiation criterion used is sufficient to reproduce the observed ductile failure response of the specimen. Failure of the spot welded lap joint is initiated at the HAZ/fusion zone interface with localized necking.